XXXVII SCAR Delegates Meeting
India, September 2022

Ice Sheet Mass Balance and Sea Level
(ISMASS)
2020-22 Report

Summary

Report Author(s)
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Heiko Goelzer (HEIG@norceresearch.no) – NORWAY (ISMASS chair)
Catherine Ritz (catherine.ritz@univ-grenoble-alpes.fr) – FRANCE (ISMASS past chair)
Guðfinna Áðalgeirsdóttir (gua@hi.is) – ICELAND (ISMASS IASC representative)
Edward Hanna (ehanna@lincoln.ac.uk) – UK (ISMASS CliC representative)

Summary of activities from 2020-22

ISMASS is dedicated to both Arctic and Antarctic science and is supported by SCAR, CliC, and IASC. The following information does not directly concern Antarctica but Greenland. However, the tools are common for both ice sheets. ISMASS promoted an intercomparison project (SMBMIP, also in the framework of ISMIP6) which is being led by Dr. Xavier Fettweis (University of Liege, Belgium; Xavier.Fettweis@uliege.be and ISMASS member) and has recently evaluated regional climate model (RCM), positive degree day (PDD) and global climate model (GCM) estimates of surface mass balance (SMB) for the Greenland Ice Sheet, with the goal of forcing ice sheet models with reconciled information from SMB models. The results are published in The Cryosphere: Fettweis, X. et al.: GrSMBMIP: intercomparison of the modelled 1980–2012 surface mass balance over the Greenland Ice Sheet, The Cryosphere, 14, 3935–3958, https://doi.org/10.5194/tc-14-3935-2020, 2020.

Virtual EGU 2021 session on ice sheet mass balance and sea-level. ISMASS has organized a joint session with ISMIP6 titled “Integrating models and observations for the estimation of ice sheet mass balance and sea level, incorporating ISMASS/ISMIP6” at vEGU21: Gather Online, 19–30 April 2021.

Hybrid EGU 2022 session on ice sheet mass balance and sea-level. ISMASS organized a joint session with ISMIP6 titled “Ice sheet mass balance and sea level: ISMASS/ISMIP6 and beyond” at the General Assembly 2022, 23–27 May 2022.

The Ice Sheet Model Intercomparison Project for CMIP6 (ISMIP6), with ISMASS chair Heiko Goelzer taking a leading role in the Greenland projections, has delivered
key publications that formed an important basis for the latest IPCC assessment report (AR6) for both the Greenland and Antarctic ice sheets (see publication list).

In connection with Cryosphere 2022, the ISMASS Consortium organises a special session on recent and future ice-sheet changes (Ice sheets: weather versus climate) within the IGS Symposium to be held in Reykjavik in August 2022. This **1.5-day workshop** will explore the degree to which short-term fluctuations and extreme events in the ice sheets (both Greenland and Antarctica) in the last two decades reflect their longer-term evolution and response to ongoing climate change. The workshop is sponsored by CliC, IASC and SCAR.

The 2022 allocated budget of 6350 USD is used for the ISMASS workshop in Reykjavik, especially to accommodate early career researchers to attend the meeting.

Key challenge was the ongoing Covid-19 pandemic, which reduced ISMASS meeting activities during this reporting period.

### Summary Budget 2021 to 2024

<table>
<thead>
<tr>
<th></th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spent</td>
<td>0</td>
<td>6350</td>
<td>2500</td>
<td>2500</td>
</tr>
<tr>
<td>(US$)</td>
<td></td>
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Progress to date

Sub-group Outcomes Summary

<table>
<thead>
<tr>
<th>Sub-group</th>
<th>Activity/Outcome/Benefit/Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model intercomparisons and ISMIP6</td>
<td>ISMASS has a strong expertise in model intercomparisons. ISMIP6 is designed to deliver projections of the ice sheet contribution to sea level rise. ISMIP6 brings together a consortium of international ice sheet models and coupled ice sheet – climate models. This effort explored the sea level contribution from the Greenland and Antarctic Ice Sheet in our changing climate and assess the impact of large ice sheets on the climate system.</td>
</tr>
<tr>
<td>SMB model intercomparison</td>
<td>SMBMIP Greenland</td>
</tr>
</tbody>
</table>

Sub-group Cash Flow

*(Since previous report to Delegates in 2020)*

<table>
<thead>
<tr>
<th>Sub-group</th>
<th>Allocation</th>
<th>Amount spent 2020</th>
<th>Amount spent 2021</th>
<th>Amount spent 2022</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

Future plans

Planned activities in 2022 to 2024

<table>
<thead>
<tr>
<th>Sub-group</th>
<th>Planned activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ice sheets: weather versus climate</td>
<td>Workshop in Reykjavik (August 2022)</td>
</tr>
<tr>
<td>Involvement in INSTANT</td>
<td>ISMASS has a strong expertise in ice sheet modelling and INSTANT will investigate the link between past and future ice sheet changes on long and on short timescales in Antarctica. Exchanges with INSTANT will be beneficial for both parties. Ritz is leading a sub-committee to work on ice sheet models bridging different time and spatial scales.</td>
</tr>
<tr>
<td>Model intercomparisons and ISMIP6</td>
<td>ISMASS has a strong expertise in model intercomparisons and will contribute to ISMIP6 and other intercomparison exercises. H. Goelzer is leading ongoing Greenland ice sheet intercomparisons in ISMIP6. F. Pattyn is leading the CalvingMIP project, which is part of EU-project PROTECT. Two workshops will be organized in 2023/24, one dedicated to ISMIP6 and one to the CalvingMIP.</td>
</tr>
</tbody>
</table>
Planned use of funds for 2022 to 2024

<table>
<thead>
<tr>
<th>Year (YYYY)</th>
<th>Purpose/Activity</th>
<th>Amount (in USD)</th>
<th>Contact Name</th>
<th>Contact Email</th>
</tr>
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<tbody>
<tr>
<td>Ice sheets: weather versus climate</td>
<td>Workshop in Reykjavik</td>
<td>6350</td>
<td>E. Hanna</td>
<td></td>
</tr>
<tr>
<td>Calving MIP</td>
<td>Workshop</td>
<td>3000</td>
<td>F. Pattyn</td>
<td></td>
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<tr>
<td>ISMIP6/ISMASS</td>
<td>Workshop</td>
<td>2000</td>
<td>H. Goelzer</td>
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<tr>
<td></td>
<td>Total</td>
<td>11350</td>
<td></td>
<td></td>
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</table>

Any additional detail on funds usage and desired results/outcomes
SCAR funds are generally used to organize workshops and attend SCAR meetings. ISMASS uses the budget primarily to enable ECRs to attend meetings and workshops. The remainder is spent to comply with publication costs and workshop organizations (see planned activities).

Percentage of the budget to be used for support of early-career researchers
2022: 50%  (Was 80% but for SCAR it is more like 50% since we focused CliC and IASC on ECS).
2023: 50%
2024: 50%

Percentage of the budget to be used for support of scientists from countries with developing Antarctic programmes
2022:
2023:
2024:
## Membership

### Leadership

<table>
<thead>
<tr>
<th>Role</th>
<th>First Name</th>
<th>Last Name</th>
<th>Affiliation</th>
<th>Country</th>
<th>Primary Language</th>
<th>Email</th>
<th>Date Started</th>
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<tbody>
<tr>
<td>Chair</td>
<td>Heiko</td>
<td>Goelzer</td>
<td>NORCE</td>
<td>Norway</td>
<td>German</td>
<td><a href="mailto:heig@norceresearch.no">heig@norceresearch.no</a></td>
<td></td>
</tr>
<tr>
<td>SCAR representative</td>
<td>Frank</td>
<td>Pattyn</td>
<td>ULB</td>
<td>Belgium</td>
<td>Dutch/French</td>
<td><a href="mailto:Frank.Pattyn@ulb.be">Frank.Pattyn@ulb.be</a></td>
<td></td>
</tr>
<tr>
<td>CliC representative</td>
<td>Edward</td>
<td>Hanna</td>
<td>Lincoln University</td>
<td>UK</td>
<td>English</td>
<td><a href="mailto:ehanna@lincoln.ac.uk">ehanna@lincoln.ac.uk</a></td>
<td></td>
</tr>
<tr>
<td>IASC representative</td>
<td>Gudvinna</td>
<td>Adalgeirsdottir</td>
<td>University Iceland</td>
<td>Iceland</td>
<td>Icelandic</td>
<td><a href="mailto:gua@hi.is">gua@hi.is</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Catherine</td>
<td>Ritz</td>
<td>IGE</td>
<td>France</td>
<td>French</td>
<td><a href="mailto:Catherine.ritz@univ-grenoble-alpes.fr">Catherine.ritz@univ-grenoble-alpes.fr</a></td>
<td></td>
</tr>
</tbody>
</table>

*(Please identify early-career researchers with * in first column)*

### Other members

<table>
<thead>
<tr>
<th>First Name</th>
<th>Last Name</th>
<th>Affiliation</th>
<th>Country</th>
<th>Primary Language</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dan</td>
<td>Dixon</td>
<td>University of Maine</td>
<td>USA</td>
<td>English</td>
<td><a href="mailto:Daniel.Dixon@umit.maine.edu">Daniel.Dixon@umit.maine.edu</a></td>
</tr>
<tr>
<td>Xavier</td>
<td>Fettweis</td>
<td>ULiège</td>
<td>Belgium</td>
<td>French</td>
<td><a href="mailto:Xavier.fettweis@uliege.be">Xavier.fettweis@uliege.be</a></td>
</tr>
<tr>
<td>Andrew</td>
<td>Shepherd</td>
<td>University of Leeds</td>
<td>UK</td>
<td>English</td>
<td><a href="mailto:A.Shepherd@leeds.ac.uk">A.Shepherd@leeds.ac.uk</a></td>
</tr>
<tr>
<td>Pippa</td>
<td>Whitehouse</td>
<td>Durham University</td>
<td>UK</td>
<td>English</td>
<td><a href="mailto:Pippa.whitehouse@durham.ac.uk">Pippa.whitehouse@durham.ac.uk</a></td>
</tr>
<tr>
<td>Florence</td>
<td>Colleoni</td>
<td>OGS Trieste</td>
<td>Italy</td>
<td>Italian</td>
<td><a href="mailto:fcolleoni@inogs.it">fcolleoni@inogs.it</a></td>
</tr>
<tr>
<td>Ellyn</td>
<td>Enderlin</td>
<td>University of Maine</td>
<td>USA</td>
<td>English</td>
<td><a href="mailto:Ellyn.enderlin@gmail.com">Ellyn.enderlin@gmail.com</a></td>
</tr>
<tr>
<td>David</td>
<td>Holland</td>
<td>New York University</td>
<td>USA</td>
<td>English</td>
<td><a href="mailto:David.holland@nyu.edu">David.holland@nyu.edu</a></td>
</tr>
</tbody>
</table>

*(Please identify early-career researchers with * in first column)*
**Additional information (optional)**

**Notable Papers**

*(Five to ten most notable papers – see the example below, which includes a brief statement (shaded) indicating the link to the group)*


The Ice Sheet Model Intercomparison Project for CMIP6 (ISMIP6), with ISMASS chair Heiko Goelzer taking a leading role in the Greenland projections, has delivered several key publications that formed an important basis for sea-level projections of the latest IPCC assessment report (AR6).


Model Intercomparison study that evaluates the response of the Antarctic ice sheet to a complete removal of all ice shelves. Important community paper
studying and the end member sensitivity of the Antarctic ice sheet, co-lead by Frank Pattyn

Direct support from outside organisations received for your activities
1. WCRP-CliC: 6000 CHF
2. IASC: 12783 Euros

Major collaborations your group has with other SCAR groups and with organisations/groups beyond SCAR
Within SCAR
1. INSTANT. (Florence Colleoni is co-lead and F. Pattyn, C. Ritz and Heiko Goelzer are members)

Outside SCAR
1. IASC Cryosphere Working Group (T; Aðalgeirsdóttir is also the Chair)
2. WCRP-CliC (E. Hanna is also CliC activity leader, H. Goelzer is one of the scientific steering committee members of ISMIP6)
3. WCRP Grand Challenge on Regional Sea Level and its impacts (H. Goelzer is member)
4. WCRP Lighthouse activity Safe Landing Climates (H. Goelzer is leading the working group Sea Level Rise)

Outreach, communication and capacity-building activities
Due to ongoing Covid-19, ISMASS outreach and communication activities were reduced during this reporting period

Contributions to equality, diversity, and inclusion (EDI)
We have invited APECS under EDI guidelines to help in the process of selecting an ECS scientist to work in the organizing committee in preparation for the upcoming workshop “Ice Sheets: Weather versus Climate”. This has led to increasing diversity in the organizing committee.

We have allocated the largest share of funding available for the workshop to support a diverse group of ECS with travel funding, selected in an open competition under EDI guidelines in collaboration with APECS and the recruited ECS on the organizing committee.